National Fire Academy

FESHE Model Curriculum

Bachelor's

February 2008

FEMA

Course Title: Analytical Approaches to Public Fire Protection

Course Description:

This course examines the tools and techniques of rational decision making in Fire and Emergency Services agencies including data collection, statistics, probability, decision analysis, utility modeling, resource allocation, and cost-benefit analysis.

Course Outcomes:

Course Goals:

This course will provide you with many of the analytical tools necessary to evaluate your options and to make intelligent, well-informed decisions that will enable you to offer the best service to your community and to the members of your organization. By the end of this course, you will be able to select and apply the appropriate statistical and quantitative tools and techniques of analytical decision-making in the context of the Fire and Emergency Services agencies. You will be able to perform the following techniques of analysis: defining the problem, collecting data, selecting appropriate analytic tools, and evaluating the results.

The course is divided into five Modules, each of which has several sections, with related topics covered therein. This course structure is designed for continuous critical thinking and skill-building. You'll be required to actively participate in online discussions and submit written assignments.

Please be prepared to spend approximately 12 to 15 hours per week (reading, research, discussions, writing) over the next 15 weeks to complete a four (4) credit course. I think you'll find this course interesting, challenging and thought-provoking. I'm looking forward to getting to know each of you and working with you this term.

Required Course Reading Materials:

1. ***Fire Protection Handbook,*** Volumes I and II. Arthur E. Cote (Editor). 19th ed, National Fire Protection Association (January 1, 2003); ISBN #: 0877654743.National Fire Protection Association, 2003.
2. ***Fire Data Analysis Handbook, 5th ed.*** United States Fire Association. New York: W.H. Freeman and Company, 2000.

Course Objectives:

Module I: Analytical Thinking, Data and Information
Module Objectives:

- Articulate the importance of rational-decisionmaking and the analytical thinking that underlies it.
- Given a scenario, determine which research methodologies are most effective.
- Apply critical thinking techniques to evaluate the research of others.
- Determine the difference between data and information.
- Identify the advantages and disadvantages of using a database.
- Analyze the structure and use of databases.
- Interpret graphs, frequency charts, and histograms.
- Measure the usefulness of means and standard deviations -- the measures of centrality and spread.
- Analyze database design and develop descriptive statistics to address a range of Fire and Emergency Services issues.

Module II: Decision Analysis, Mathematical Modeling and GIS
Module Objectives:

- Apply system analysis techniques to decisionmaking.
- Compare and contrast event and decision trees and how they aid in decision analysis.
- Evaluate the functions of mathematical modeling.
- Illustrate the benefits and limitations of using a mathematical function to model the relationship between multiple factors.
- Demonstrate how the ISO Fire Suppression Rating Schedule is an example of utility modeling that can be used in the fire services.
- Analyze the benefits and limitations of using a mathematical function to model the relationships between multiple factors.
- Correlate input conditions and constraints.
- Apply mathematical techniques to a model system in order to make reasonable predictions.
- Evaluate how to implement GIS in an emergency service agency.
- Apply GIS to identify and evaluate a community's risk and hazard level.

Module III: Probability
This module is divided into three main sections:
Module Objectives:

- Compute probabilities of simple and compound events.
- Apply Bayes' to decision-making situations in the Fire and Emergency Services.
- Determine the number of possible permutations and combinations.
- Solve simple probability problems.

Module IV: Resource Allocation and Cost Benefit Analysis
Module Objectives:

- Calculate run distances, travel times and company workload using graphing techniques, hand calculations and statistical analysis.
- Explore various automated tools available to do statistical analysis of resource allocation.
- Assess and interpret fire station location issues and recommendations supported by analysis.

Module V: Linear Programing and Putting it All Together
Module Objectives:

- Apply the five steps of CBA to Fire and Emergency Services related issues.
- Analyze the function and impact of linear programming on decisionmaking.
- Graph linear equations.
- Set up linear programming problems.
- Determine the feasible region of linear programming problems.
- Determine the point at which two linear equations intersect.
- Apply minimum and maximum constraints to linear programming problems.
- Solve fire- and EMS-related linear programming problems.

Course Title: Applications of Fire Research

Course Description:

This course examines the basic principles of research and methodology for analyzing current fire-related research. The course also provides a framework for conducting and evaluating independent research in the following areas: fire dynamics, fire test standards and codes, fire safety, fire modeling, structural fire safety, life safety, firefighter health and safety, automatic detection and suppression, transportation fire hazards, risk analysis and loss control, fire service applied research and new trends in fire-related research.

Course Outcomes:

1. Locate, evaluate, and analyze fire-related research.
2. Demonstrate the application of fire research to a research problem related to one of the course topics.
3. Conduct a literature review of current research on a fire-related topic.
4. Write a fire-related research proposal.
5. Design a research plan using one or more qualitative and/or quantitative methodologies.

Course Goals:

At the end of this course, you should be able to understand the rationale that fire research organizations use for conducting fire-related research. You will be able to locate, evaluate, analyze, and interpret current fire-related research independent of the research methodology and approach employed. You will identify a research problem in need of further testing or research and independently complete a literature review and write a research proposal.

Required Course Reading Materials:

1. ***Fire Protection Handbook*** **(National Fire Protection Association)**, Volumes I and II, Arthur E. Cote (Editor), 19th edition (January 1, 2003). Publisher: National Fire Protection Association; ISBN #: 0877654743.
2. ***Practical Research Planning and Design,*** by Leedy, P & Ormond, Ellis Jeanne. 8th Edition (February 2004). Prentice Hall; ISBN #: 0131108956.

Course Objectives and Reading Assignments:

Module I: Fundamentals

- Consider what is research and why we study it
- Understand fire related research objectives
- Analyze and discuss fire research goals and objectives in relation to the NIST-led technical investigation of the World Trade Center disaster

- Research, evaluate and discuss four sources from which information on fire research is available
- Identify fire research organizations and programs that have applications to the fire service
- Identify areas of fire related research
- Conduct a preliminary review of current research in a chosen fire related topic
- Investigate, evaluate and interpret research in the area of Fire Dynamics
- Investigate, evaluate and interpret research in the area of Fire Test Standards and Codes

Module II: Focusing Your Research Efforts

- Define research and its foundations
- Introduce research methods and approaches.
- Demonstrate an understanding of the scientific method
- Conceptualize a strategy for generating research problems
- Formulate a suitable research problem in an area of fire sciences
- Develop a preliminary research proposal outline
- Distinguish between testing and experimental research
- Compare the results of mathematical fire modeling to full scale fire testing
- Distinguish between small, medium, and large scale tests and when it is appropriate to use them
- Understand sampling procedures
- Investigate, evaluate and interpret research in the area of Fire Safety Properties and Flammability Tests
- Investigate, evaluate and interpret research in the area of Fire Modeling

Module III: Qualitative Research Methodologies

- Develop a familiarity with qualitative research methods and approaches
- Apply concepts of qualitative methods to fire related research
- Select appropriate qualitative methods according to the type of research question raised
- Interpret conclusions drawn from qualitative methods, based on an analysis of the strengths and weaknesses of the methodology
- Conduct a literature review related to a fire research problem.
- Investigate, evaluate and interpret research in the area of Structural Fire Safety
- Investigate, evaluate and interpret research in the area of Life Safety
- Investigate, evaluate and interpret research in the area of Firefighter Health and Safety

Module IV: Quantitative Research Methodologies

- Develop a familiarity with quantitative research methods and approaches
- Apply concepts of quantitative methods to fire related research
- Apply statistical concepts and data analysis to quantitative research design

- Select an appropriate quantitative design when the conditions of the research problem demand measurement of variables and relationships
- Select appropriate statistical techniques according to the type of research question raised within a quantitative study
- Interpret conclusions drawn from statistics as to whether or not they reflect the true properties of phenomena under study
- Design a research project within a fire research sub-field, and establish techniques for data gathering and analysis
- Investigate, evaluate and interpret research in the area of automatic detection and suppression
- Investigate, evaluate and interpret research in the area of transportation fire hazards
- Investigate, evaluate and interpret research in the area of risk analysis and loss control

Module V: Applications and Trends in Fire Related Research

- Consider applications of fire related research to fire safety and prevention
- Consider future developments in fire related research
- Propose specific areas for future research and testing
- Discuss how his or her research proposal relates to either applications of fire related research, future trends in fire related research, or both
- Investigate, evaluate and interpret research in the area of fire service applied research
- Investigate, evaluate and interpret research in the area of new trends in fire related research
- Complete a formal research proposal in a fire related field, applying either qualitative or quantitative methods, or a combination of both

Course Title: Community Risk Reduction for the Fire and Emergency Services

Course Description:

This course provides a theoretical framework for the understanding of the ethical, sociological, organizational, political, and legal components of community risk reduction, and a methodology for the development of a comprehensive community risk reduction plan.

Course Outcomes:

1. Become champions of risk reduction
2. Develop and meet risk reduction objectives
3. Identify and develop intervention strategies
4. Implement a risk reduction program
5. Review and modify risk reduction programs

Course Goals:

Provide a theoretical framework for the understanding of the ethical, sociological, organizational, political, and legal components of community risk reduction, and a methodology for the development of a comprehensive community risk reduction plan.

Required Course Reading Materials:

1. Bruhn, John G. *The Sociology of Community Connections.*Springer: 2005. ISBN: 0306486164
2. ***Fire Protection Handbook***, Volumes I and II, 19th ed. Arthur E. Cote (Editor). National Fire Protection Association (January 1, 2003); ISBN #: 0877654743.

Course Objectives:

Module I: Introduction to Community Risk Reduction for the Fire and Emergency Services

- Define and understand community risk and community risk reduction.
- Evaluate the benefits and challenges of community risk reduction.
- Analyze the fire and emergency services department's and officer's role in community risk reduction.
- Develop a personal vision statement for community risk reduction in your community.
- Establish your community risk reduction planning processes.

Module II: Develop and Meet Risk Reduction Objectives

- Gain a thorough knowledge of your community by conducting a community inventory.
- Identify hazards and assess your community's vulnerability.
- Define levels of risk acceptable to your community.
- Assess the risks and establish risk reduction priorities.
- Create your risk reduction objectives.

Module III: Identify and Develop Intervention Strategies

- Identify potential risk reduction strategies.
- Analyze cost versus benefit to determine a plan of action for your community risk reduction plan.
- Select realistic and achievable risk reduction strategies.
- Develop an intervention strategy.

Module IV: Implement a Risk Reduction Program

- Identify and locate needed resources for a community risk reduction plan.
- Develop a risk reduction implementation schedule.
- Assign roles and responsibilities within the risk reduction team.
- Create your community risk reduction action plan.

Module V: Review, Modify, and Market Risk Reduction Programs

- Develop a risk reduction evaluation strategy.
- Review and evaluate results of the evaluation process.
- Modify your risk reduction initiatives.
- Develop a marketing/dissemination plan.
- Finalize the executive summary of your risk reduction plan.

Course Title: Disaster Planning and Control

Course Description:

This course examines concepts and principles of community risk assessment, planning, and response to fires, natural and man-made disasters, including NIMS ICS, mutual aid and automatic response, training and preparedness, communications, civil disturbances, terrorist threats/incidents, hazardous materials planning, mass casualty incidents, earthquake preparedness, and disaster mitigation and recovery.

Course Outcomes:

By the end of this course, you will be able to discuss the importance of disaster planning, preparation and mitigation, evaluate the hazard assessment processes and the role of the firefighter in community disaster planning and recovery, assess hazard response and planning procedures, and define the impact of hazard occurrence on community response. Additionally, you'll be able to define the parameters and effectiveness of an Emergency Operations Plan and its components, differentiate the multi-level agency responsibilities in disaster mitigation, and define the relationships between disaster planning, mitigation, and recovery.

Course Goals:

The goal of this course is to prepare you for professional service in all levels of government, business, and industry with regard to comprehensive disaster and fire defense planning processes and implementation.

Required Course Reading Materials:

Disaster Planning and Control, William Kramer, PennWell Corp., January 2008.

Course Objectives:

Module I: Disaster Anticipation and Preparation

- Explain the generic and technical meanings of disaster and emergency;
- Identify the types of disasters and their similarities and differences;
- Examine the importance of disaster planning;
- Differentiate between human-caused and technological hazards, natural hazards, and domestic security threats;
- Identify the distinguishing characteristics of hazards, emergencies, and disasters;
- Analyze the provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act as they relate to the National Response Plan/National Response Framework (NRP/NRF) for local and state emergencies; and
- Evaluate why a team approach to disaster planning is recommended.

Module II: Managing Disasters

- Describe the hazard assessment process;
- Evaluate the purpose of capability assessment;
- Examine the concepts of mutual aid and automatic aid;
- identify the personnel and agencies that play a role in formulating an EOP;
- Analyze the fire department's leadership role in integrated community disaster planning;
- Differentiate the availability of outside resources: local, state, Federal, and private;
- Identify communications issues regarding the levels of people in local, state, and Federal agencies that will respond in times of disaster;
- Define the modes of communications that can be used during major emergencies and the individuals who need to share information;
- Analyze the communications needs of each organizational level;
- List the communications modes available to emergency response agencies during major emergencies;
- Determine the different uses of computers during major emergencies;
- Evaluate the most common types of communications problems that develop during major emergencies; and
- Illustrate alternative/redundant communications systems in the event of system failure.

Module III: Frequent Threats - Fire, Transportation and HAZ-MAT

- Examine the background and development of NIMS-ICS;
- Evaluate the principles and features of NIMS-ICS;
- Correlate how an NIMS-ICS incident organization expands or contracts to meet operational needs of the incident or event;
- Identify the difference in required responses for different types of hazards;
- Illustrate examples of each hazard type;
- Assess the unique planning issues for each hazard type; and
- Analyze the impact on the community of each hazard type.

Module IV: Growing Threats, Global Concerns

- Identify the personnel and agencies that play a role in formulating an EOP;
- Outline the four problems that confront fire chiefs in the development of Emergency Operations Plans (EOPs);
- Examine the steps in preparing a written EOP;
- Assess the purpose and components of the EOP Basic Plan;
- Evaluate how an EOP resource inventory supports the plan; and
- Review the planning issues that are common to the development of most EOPs;
- Describe the multi-agency responsibilities of disaster response;

- Select how functional annexes and hazard-specific appendices support the overall emergency management plan;
- Compare and contrast the differences in required responses for different types of hazards;
- Analyze the use of branches, divisions, and groups within the Operations Section, and correlate the supervisory titles associated with each level;
- Determine the advantages of Unified Command and the kinds of situations that may call for a Unified Command organization;
- Correlate the primary features of a Unified Command organization;
- Classify the kinds of incident management problems that the lack of multi-agency coordination can create;
- Compare the levels at which multi-agency coordination commonly is accomplished; and
- Examine the primary components of a multi-agency coordination system.

Module V: Natural Disasters & Recovery

- Identify the four phases of a disaster and describe the partnerships among the Federal, state, and local governments in each of the four phases;
- Compare several forms of Federal assistance and explain the terms and conditions under which Federal disaster relief may be made available;
- Outline the sequence of events through which a Presidential disaster may be declared;
- Examine the stages of the damage assessment process and the reporting requirements following a disaster;
- Evaluate the roles and responsibilities of key state and Federal personnel in responding to a declared major disaster;
- Assess the various Federal, state, and local assistance programs available to disaster victims during the recovery phase;
- Determine some typical responses that may be anticipated in disaster survivors and workers;
- Calculate the capabilities of and methods for accessing the crisis counseling and stress management programs during disaster response and recovery operations;
- Evaluate the Federal assistance programs available to supplement state and local governments recovering from a major disaster;
- Correlate the concepts of mitigation and recovery with natural and technological hazard events; and
- Analyze the interrelationships between mitigation and recovery phases.

Course Title: Fire Dynamics

Course Description:

This course examines the underlying principles involved in structural fire protection systems, building furnishings, and fire protection systems including water-based fire suppressions systems, fire alarm and detection systems, special hazard suppression systems, and smoke management systems.

Course Outcomes:

1. Analyze building structural components for fire endurance and fire resistance.
2. Understand the flame spread and smoke production properties of building furnishings and materials.

Course Goals:

At the end of this course, you should be able to understand the fundamental principles related to structural fire protection, building furnishings, and fire protection systems.

Required Course Reading Materials:

Fire Protection Handbook **(National Fire Protection Association)**, Volume I and II, Arthur E. Cote (Editor), 19th edition (January 1, 2003). Publisher: National Fire Protection Association; ISBN #: 0877654743.

Course Objectives:

Module I: Definition, Units, Fire Tetrahedron, Heat Transfer, Heat of Combustion, Ideal Gas Law

- Understand the definition and history of fire dynamics.
- Review examples of fire incidents.
- Become proficient in using S.I. units and converting between units.
- Understand the fire tetrahedron.
- Know the difference between diffusion flames and premixed flames.
- Classify the three modes of heat transfer and describe their relevance to fires.
- Solve simple heat transfer problems.
- Understand the principles of heats of combustion.
- Solve elementary problems involving the Ideal Gas Law.

Module II: Ignition and Flame Spread of Materials

- Given a specific fuel type and form, describe the ignition and fire growth process.
- Explain the process of flame spread in liquid fuels and calculate the burning rate for a liquid fuel fire.

- Explain the process of flamespread over a solid fuel and list variables that affect flame spread rate.
- Be able to predict ignition times for various fuels.

Module III: Plumes

- Calculate flame height.
- Calculate the thermal radiation from a flame.
- Define the structure of buoyant plumes and ceiling jets.
- Calculate the temperature, velocity, and mass flow rate of a fire plume.
- Predict a fire's heat release rate using the time squared method.
- Explain the impact of walls and corners on flames and plumes.
- Estimate operation time of sprinklers and heat detectors.
- Estimate the heat release rate needed for flashover.

Module IV: Smoke

- Define smoke.
- Understand the dangers of smoke.
- Describe the effects of visibility in smoke and calculate viewing distance in smoke.
- Discuss the toxicity of smoke.
- Explain how stack effect controls the movement of smoke.
- Understand the various methods of controlling smoke.
- Estimate the amount of smoke produced by a fire.
- Calculate the filling rate of smoke in a space.

Module V: Explosions

- Discriminate between deflagrations and detonations.
- Classify three types of explosions.
- Relate blast effects and overpressure to property damage and life safety.
- Differentiate between a BLEVE and an UVCE.
- Explain the fire and explosion potential in concentrated dust environments.
- Calculate the TNT equivalent of a given amount of material.
- Relate TNT equivalence to overpressure.
- Relate overpressure to damage.

Course Title: Fire and Emergency Services Administration

Course Description:

This course is designed to be a progressive primer for students who want more knowledge about fire and emergency services administration. The course demonstrates the importance of the following skills, necessary to manage and lead a fire and emergency services department through the challenges and changes of the 21st century: Persuasion and influence, accountable budgeting, anticipation of challenges and the need for change, and using specific management tools for analyzing and solving problems. A central part of the course focuses on how the leadership of a fire and emergency services department develops internal and external cooperation to create a coordinated approach to achieving the department's mission.

Course Outcomes:

1. Define and discuss the elements of effective departmental organization.
2. Classify what training and skills are needed to establish departmental organization.
3. Analyze the value of a community-related approach to risk reduction.
4. Outline the priorities of a budget planning document while anticipating the diverse needs of a community.
5. Assess the importance of positively influencing community leaders by demonstrating effective leadership.
6. Analyze the concept of change and the need to be aware of future trends in fire management.
7. Report on the importance of communications technology, fire service networks, and the Internet when conducting problem-solving analysis and managing trends.
8. Develop a clear understanding of the national assessment models and their respective approaches to certification.

Course Goals:

The goal of Fire and Emergency Services Administration is to provide students with the knowledge to understand how to help the fire and emergency services administrator perform as an effective risk manager by recognizing legal and political issues affecting public safety, finding and applying appropriate legal rules and/or political constructs, and articulating supportable
conclusions and recommendations.

Required Course Reading Materials:

Chief Fire Officers Desk Reference. International Association of Fire Chiefs. Edited by John M. Buckman, III.: Jones and Bartlett Publishers. 2006.

Course Objectives:

Module I: Leading and Managing Purposefully with a Community Approach

- Describe the role of the fire/emergency medical services department as a part of the community government and comprehensive plan.
- Explain the importance of a good working relationship with public officials and the community as a whole.
- Assess ways to develop a good working relationship with public officials and the community.
- Identify local, state, and national organizations that will be beneficial to your department.
- Describe how to take a proactive role in local, state, and national organizations.
- Identify effective skills for developing a cooperative relationship with fire and emergency services personnel as well as public officials and the general public.

Module II: Core Administrative Skills

- Identify the core skills essential to administrative success.
- Describe the integrated management of financial, human, facilities, and equipment and information resources.
- Explain the importance of public access to government operations.
- Describe the key elements of successful communication.
- Recognize the basic management theory in use in your agency.
- Recognize the formal and informal dynamics of public organizations and describe strategies to ensure success.
- Discuss the components and styles of leadership.
- Identify and discuss a practical agency evaluation process.

Module III: Planning and Implementation

- Describe the process of consensus-building.
- Describe the components of project planning.
- Identify the steps of the planning cycle.
- Discuss how an environmental assessment determines the strategic issues and direction of an organization.
- Assess the interrelationship between budgeting, operational plans, and strategic plans.
- Analyze the importance of an organizational culture and mission in the development of a strategic plan.
- Describe the purpose, function, and current and future security concerns of working document publicaion, storage, and integrity.
- Explain how a fire and emergency service administrator creates a vision of the future for his or her organization.

Module IV: Leading Change

- Describe the importance of accepting and managing change within the fire and emergency services department.
- Identify models of change commonly used in organizations.
- Summarize the steps of the change management process.
- Assess ways to create a positive climate for change and introduce new ideas within the organization.
- Describe how an organization can respond to current or emerging events or trends.
- Explain the benefits of employee involvement in departmental decisions.
- Demonstrate innovative ways to address traditional problems within the organization.
- Describe ways to increase and reward professional development efforts.

Module V: CRM - A 21st Century FESA Responsibility

- Assess the importance of integrating fire and emergency services into a community's comprehensive plan.
- Assess your organization's capabilities and needs based on risk analysis probabilities.
- Describe the relationship between community risk analysis and strategic and operational planning.
- Identify the major steps of a community risk assessment.
- Identify direct and indirect costs associated with fire.
- Analyze economic incentives that encourage and discourage fire prevention.
- Describe the role of fire and emergency services in the economic development and neighborhood preservation programs of the community.

Course Title: Fire Investigation and Analysis

Course Description:

This course examines the technical, investigative, legal, and social aspects of arson, including principles of incendiary fire analysis and detection, environmental and psychological factors of arson, legal considerations, intervention, and mitigation strategies.

Course Outcomes:

1. Demonstrate a technical understanding of the characteristics and impacts of fire loss and the crime of arson necessary to conduct competent fire investigation and analysis.
2. Document the fire scene, in accordance with best practice and legal requirements.
3. Analyze the fire scenario utilizing the scientific method, fire science, and relevant technology.
4. Analyze the legal foundation for conducting a systematic incendiary fire investigation and case preparation.
5. Design and integrate a variety of arson related intervention and mitigation strategies.

Course Goals:

This course prepares the student to recognize and apply best practices in the investigation of fires, to conduct the origin and cause determination procedures and practices necessary to ascertain if the fire was accidental or incendiary, to prepare the investigative reports necessary to document such analysis, and to apply the findings and knowledge acquired through such efforts to reduce the consequence of both accidental and intentional fires.

Required Course Reading Materials:

1. *Fire Protection Handbook (National Fire Protection Association),* Volumes I and II, Arthur E. Cote (Editor), 19th edition (January 1, 2003). Publisher: National Fire Protection Association; ISBN #: 0877654743.
2. *NFPA 921: Guide for Fire and Explosion Investigations,* 2004 Edition, Item#: 92104
3. *User's Manual for NFPA 921: Guide for Fire and Explosion Investigations,* 2004 Edition, Item#: 921GD05

Course Objectives:

Module I: Introduction to Fire Investigation and Analysis

- Compare and contrast local, state, or national fire data trends related to cause, property type, deaths, injuries, and dollar loss as a result of both accidental fires and arson.
- Define and properly apply the classification factors utilized to describe the four fire cause determinations.
- Assess and compare the major (USFA-NFPA) fire data collection systems, methods, and analytical techniques used to quantify and qualify the nations fire loss experience.
- Identify and examine the major organizations with resources available to assist communities as they develop fire analysis procedures.
- Describe the six motives for incendiary fire.
- Explain other factors to consider when conducting a fire investigation such as sociology and culture. Explain the design objective of fire-resistant building components and assemblies

Module II: Origin and Cause Determination

- Explain the significance of using the scientific method in fire investigations and the importance of fire investigation as a science.
- Describe how the basic steps in fire investigation relate to the sequence of events in proper scene documentation.
- Describe the significance of preserving the fire scene and how initial observations made by first responders (fire, police, EMS) may lead to origin and cause determination.
- Explain the functional organization and significance of the fire investigative team, including the canine detection unit, special teams, interrogation team, and forensics unit.
- Recognize and interpret fire patterns.
- Determine the effects of fire on materials such as glass, wood, concrete, and metals.
- Describe the major steps in a comprehensive fire investigation.
- Compare and contrast the concepts of motive versus intent.
- Explain the legal requirements of the investigative process.
- Given a scenario, identify the persons who should be interviewed during an incendiary investigation.

Module III: Fire Analysis

- Explain the components of the fire tetrahedron and their relevance to fire investigation.
- Differentiate between temperature and energy.
- Describe the three methods of heat transfer.

- Explain the physical, thermal, and chemical properties of solid, liquid, and gaseous fuels, and how they are relevant to ignition and heat release rate of the fuels.
- Identify the difference between a pre-mixed and diffusion flame.
- Explain the process of ignition and burning of different fuel types.
- Describe fire growth.
- Explain the impact of fuel geometry on heat release rate.
- Compare and contrast fire plumes and ceiling jets.
- Describe the impact of ceilings, walls, and ventilation on compartment fires.
- Explain the interrelationship of fuel, compartmentation, ventilation, and heat release rate.
- Describe flashover and backdraft.
- Understand the different methods of fire modeling, both physical and computational methods, and how they may be used to test your hypothesis as part of the scientific method.
- Describe the types of standardized fire tests that are available and what material properties/characteristics can be measured.
- Examine the pros and cons of bench-scale fire testing vs. full-scale fire testing.
- Describe the types of computational fire modeling available and the capabilities and limitations of each.
- Differentiate between probabilistic and deterministic fire models, and zone and field compartment fire models.
- Understand how to apply simplified fire growth calculations to the fire investigation process appropriately.

Module IV: Incendiary Fire Investigation

- Compare and contrast the burden of proof for civil and criminal acts.
- Analyze the legal considerations to access the fire scene.
- Define the crime of arson.
- Explain how the provisions of the Fourth Amendment condition a fire investigators access to the scene.
- Define the constitutional limits involving the privilege against self-incrimination and the right to counsel in the contexts of an arrest, interrogation, and confession (Miranda).
- Compare and contrast different types of evidence.
- Describe the impact of case law relative to arson investigations.
- Apply investigative techniques, including: assignment receipt; scene response; application of scientific methodology; scene documentation/examination; evidence identification, collection, preservation (chain of custody); witnesses/suspect interrogation; and investigative case file/report development.

Module V: Strategies for Combating Arson

- Discuss the role of the community in arson reduction efforts.

- Discuss the role of local public safety organizations in developing incendiary mitigation programs.
- Discuss the role of the private sector in arson mitigation.
- Define the use of pattern recognition and other profiling techniques in identifying arson-prone targets.
- List sources of data available at the local, state, and federal levels in planning anti-arson strategies.
- Define the main elements of an effective incendiary fire prevention program.

Course Title: Fire Prevention, Organization and Management

Course Description:

This course examines the factors that shape fire risk and the tools for fire prevention, including risk reduction education, codes and standards, inspection and plans review, fire investigation, research, master planning, various types of influences, and strategies.

Course Outcomes:

1. Describe aspects of risk reduction education and overall community risk reduction.
2. Explain the fundamental aspects of codes and standards, and the inspection and plan review process.
3. Describe the fire investigation process and discuss fire prevention research.
4. Discuss historical and social influences and describe the master planning process.
5. Describe economic and governmental influences on fire prevention.
6. Explain the effects of departmental influences on fire prevention programs and activities.
7. Discuss strategies for fire prevention.

Course Goals:

Welcome to Fire Prevention, Organization, and Management. In this course we will examine the roles and responsibilities of fire prevention professionals in managing fire prevention programs and risk reduction activities to ensure public safety. We will develop an understanding of the changing role of fire prevention professionals in researching and mitigating their community's fire problem and developing solutions to the problems of tomorrow.

Required Course Reading Materials:

Carter and Rausch. 2007. ***Management in the Fire Service***, 3rd ed. Quincy, MA: National Fire Protection Association.

Course Objectives:

Module I: Concepts of Fire Prevention Methods
This module is divided into six main sections:

Roles and Responsibilities of the Fire Marshal

- Describe the duties of fire service leaders;
- Explain the importance of organized and effective leadership to fire prevention.

Risks, Perils, and Hazards

- State the role fire prevention plays within the fire department's mission;
- Explain how fire prevention is primarily a community-based strategy;
- State ways fire prevention activities can affect the community; and
- Identify potential problems and solutions to fire prevention issues.

Fire Investigation

- Describe the rights, responsibilities, and legal limits of an investigator; and
- Link cause-and-origin investigation to the community's fire prevention program.

Risk Reduction Education

- Differentiate between public education, public information, and public relations;
- Describe the elements of a successful public education program; and
- Explain the link between arson prevention, public education, and the community's fire prevention efforts

Juvenile Firesetter Intervention Programs

- Identify evolving issues in fire prevention education
- Describe the relationship between juvenile fire setters programs and fire investigation, inspection and plan review, and risk reduction education.

Fire Research

- Describe the types of fire prevention research being conducted;
- Identify organizations conducting fire prevention research; and
- Correlate the relationship between human behavior research and fire safety and prevention.

Module II: Concepts of Code Enforcement
This module is divided into two main sections:

Codes and Standards

- Point out the major historical occurrences in code development;
- Contrast standards and codes;
- Compare the code-writing processes used in the U.S. and abroad;
- Differentiate among code interpretation, code revision, and code retroactivity; and
- Explain how state and national codes interface.

Inspection and Plan Review

- Define risk reduction and fire prevention;
- Using the definition of community risk reduction, compare your community's fire prevention and risk reduction programs with risk reduction principles;
- Survey a fire department's current fire prevention system; and
- Analyze a case study to identify the fire prevention system components and their application in community risk reduction.

Module III: Aspects of Fire Prevention Planning
This module is divided into three main sections:
Historic Fires

- Report on significant events that affected fire prevention in both positive and negative ways;
- Identify individuals who have had a significant impact in fire prevention; and
- Identify publications that are important to fire prevention.

Master Planning

- Highlight the history of master planning;
- List the steps involved in master planning;
- List the major advantages of master planning, and
- Identify the major obstacles to master planning.

Cultural Influences

- Identify U.S. cultural beliefs and traditions that influence fire prevention, and
- Draw a relationship between cultural beliefs and traditions in other countries and how they affect fire prevention.

Module IV: Influences on Fire Prevention
This module is divided into three main sections:
Economic Influences

- Identify direct and indirect costs associated with fire;
- Describe the level of cost of fire in deaths, injuries, and direct costs for the U.S.;
- Discuss economic incentives that encourage fire prevention;
- Identify factors that help explain the disparity between the high aggregate costs of fire for the nation, states, and communities, and lower perceptions of fire risks and costs;
- Identify and describe policies and programs that affect the economic tradeoffs between fire and prevention by lowering the costs of fire for individual citizens, businesses, and communities.

Governmental Influences

- Identify the major federal agencies that have some responsibility for fire prevention;
- List the major U.S. Fire Administration (USFA) programs that support fire prevention;
- Identify the major state agencies that have some responsibility for fire prevention;
- Describe the broad parameters that allow the government to support fire prevention without infringing upon individual freedoms.

Departmental Influences

- State the benefits of having a mission statement;
- Offer reasons for and against fire prevention officers having law enforcement authority;
- Make an assessment of the importance attached to fire prevention in the community using current fire department data;
- Explain the importance of strong fire prevention leadership in the fire department if it is to have a positive impact on risk reduction.

Module V: Fire Prevention Policy-making

- Identify the key components of the definition of public policy;
- Identify six approaches to explaining public policy;
- Apply six approaches to how a choice was made in fire prevention;
- Identify and describe the processes of public-agenda setting;
- Define and apply the three policy streams, problem, political, and policy, to a fire prevention effort;
- Define a policy "window";
- Describe and apply forces creating a fire prevention policy "window."

Course Title: Fire Protection Structures & Systems

Course Description:

This course examines the underlying principles involved in structural fire protection systems, building furnishings, and fire protection systems including water-based fire suppressions systems, fire alarm and detection systems, special hazard suppression systems, and smoke management systems.

Course Outcomes:

1. Analyze building structural components for fire endurance and fire resistance.
2. Understand the flame spread and smoke production properties of building furnishings and materials.
3. Analyze, evaluate, and determine appropriate use for fire detection and alarm systems; water-based fire suppression systems; special hazard fire suppression systems; and smoke management systems, with a sophisticated understanding of how they integrate to function as a complete life safety system.

Course Goals:

At the end of this course, you should be able to understand the fundamental principles related to structural fire protection, building furnishings, and fire protection systems.

Required Course Reading Materials:

Fire Protection Handbook **(National Fire Protection Association)**, Volume I and II, Arthur E. Cote (Editor), 19th edition (January 1, 2003). Publisher: National Fire Protection Association; ISBN #: 0877654743.

Course Objectives:

Module I: Structural Fire Protection

- Explain the design objective of fire-resistant building components and assemblies
- Summarize the ASTM E-119 test procedure and the parameters that influence its validity
- Analyze how elevated temperatures affect steel, concrete, masonry and wood assemblies
- Outline potential problems for fire service personnel relative to the fire resistance requirements of steel, concrete, wood and masonry structures
- Compare three means of providing fire protection for steel members
- Explain the fire hazards associated with unenclosed vertical openings, atriums and concealed spaces

- Differentiate among three different methods used to limit horizontal fire and smoke spread in a building

Module II: Building Furnishings and Materials

- Summarize the application of the Steiner Tunnel Test (ASTM E-84), and its three flame-spread classifications
- Differentiate between flame spread index and smoke density
- Explain the role of floor materials in corridor fire-spread
- Articulate the four categories of dangerous effects of smoke
- Explain one smoke toxicity testing method
- List two organizations that have promulgated standards for furniture flammability
- Summarize four characteristics that contribute to the fire hazard of furniture
- Generalize the role of furnishings (materials and placement) in fire growth development

Module III: Fire Detection and Alarm Systems

- Explain the basic operating principles of smoke, heat, and flame detectors and provide applications for each
- Differentiate between an ionization and photoelectric smoke detector
- Differentiate between rate-of-rise, rate-compensated, and fixed temperature heat detectors
- Besides detection devices, list and describe three devices that can initiate a fire alarm system
- Classify four types of fire alarm system indicating devices
- Demonstrate the temporal code 3 fire alarm signal
- Summarize the operational characteristics of a voice fire alarm system
- Explain the three operational characteristics of a fire alarm control panel (alarm, trouble, supervisory)
- Determine two advantages and disadvantages of remote fire alarm system monitoring

Module IV: Fire Suppression Systems

- Compare the basic suppression principle for sprinkler, foam, dry-chemical, carbon dioxide and Halon replacement systems and provide applications for each
- Explain the difference between wet, dry, deluge, and pre-action sprinkler systems
- Assess the benefits of residential fire sprinkler systems and residential sprinkler legislation
- Select three appropriate water storage and supply sources for a water-based fire suppression system
- Classify sprinklers based on position, temperature rating, and pattern
- Apply an appropriate sprinkler system density for four occupancy classifications
- Explain two appropriate applications for a water-mist system

- Identify the required flow and pressure for the three types of standpipe system classifications
- Illustrate a standard fire pump curve and identify the three important performance points
- Compare and contrast vertical and horizontal fire pumps and apply applications for each
- Outline the procedure for performing a fire pump service test
- Classify three types of foam extinguishing agents
- Determine the correct type of system for the protection of a kitchen hood and describe its method of operation
- Explain the operating principle of a carbon dioxide suppression system
- Explain why the installation of new Halon suppression systems is prohibited in the United States
- Explain the development of two types of Halon replacement systems

Module V: Smoke Management Systems

- Explain four factors influencing smoke movement in a building
- Explain stack effect
- Distinguish between passive and active smoke management
- Compare and contrast three types of active smoke management systems
- Outline the methodology used to test a smoke management system
- Summarize the use of a firefighter's smoke control station

Course Title: Fire Related Human Behavior

Course Description:

The goal of Fire Related Human Behavior is to provide students with knowledge of what we know about how humans respond to fire and how that knowledge has been integrated into life safety systems design and development. Students will examine current and past research on human behavior, systems models, life safety education and building design to determine interactions of these areas in emergency situations. Students will develop an understanding of a best practice building life safety system as one that combines knowledge in the areas of psychology and sociology joined with engineering and education to produce the best possible outcomes in terms of human survivability in an emergency.

Course Outcomes:

1. Apply knowledge to create a system that integrates human behavior factors into life safety planning and practice.
2. Understand how psychology and sociology factors influence behavior.
3. Demonstrate how current computer systems modeling function.
4. Locate and analyze current human related fire research.

Course Goals:

The goal of Fire Related Human Behavior is to provide students with knowledge of what we know about how humans respond to fire and how that knowledge has been integrated into life safety systems design and development.

Required Course Reading Materials:

1. *Fire Protection Handbook*, Volumes I and II, 19th ed. Arthur E. Cote (Editor). National Fire Protection Association (January 1, 2003); ISBN #: 0877654743.
2. *Human Behavior in Fire*, Engineering Guide, Society of Fire Protection Engineers, 2003.

In addition to the texts, you will be reading a number of online resources and web-based research articles.

Course Objectives and Reading Assignments:

Module I: Fire and Human Behavior

- Describe the overall fire problem in the United States.
- Explain common behavioral factors in response to fire and emergencies.
- Identify the most common causes of fire in the United States.

- Explain specific human behaviors that can prevent or contribute to the occurrence of fires.
- Specify misconceptions about human behavior in fire.
- Describe factors of human decision making in fires and emergencies.
- Explain decision-making factors that affect behavior.
- Explain representativeness bias and availability bias in terms of their effects on risk perception and decision making.

Module Readings:

1. *Fire Protection Handbook,* Volume I, Section 2, Chapter 1: An Overview of the Fire Problem and Fire Protection
2. *Fire Protection Handbook,* Volume I, Section 4, Chapter 1: Human Behavior and Fire
3. Bryan, John. (2002, Fall). A Selected Historical Review of Human Behavior in Fire. *Fire Protection Engineering* at http://www.pentoncmg.com/sfpe/articles/BRYAN%20FPE%20FALL%2002.pdf
4. Winerman, Lea. (2004, September). Fighting Fire with Psychology. *APA Monitor*, Volume 35, No. 8, at http://www.apa.org/monitor/sep04/fighting.html
5. *Human Behavior in Fire*, Engineering Guide, Society of Fire Protection Engineers, pp. 1-4

Module II: Factors Influencing Behaviors

- Analyze how specific occupant characteristics relate to behavior.
- Give specific examples of how training affects behaviors.
- Cite examples of how behavior is influenced by environment.
- Explain how group dynamics affect decision making.
- Give examples of how the environment and human behavior are interdependent.
- Explain risk perception and decision-making factors that affect behavior.
- Identify the factors that influence how a threat is perceived.
- Explain how remote risks and action schemas influence risk perception and decision making.
- Determine potential fire response behaviors based on age and gender.
- Assess how occupancy category affects behaviors.
- Explain why people are more likely to die from a fire in their home than anywhere else and why
- Compare and contrast historical fires with more current fires to determine changes that have occurred.

Module Readings:

1. Badger, Stephen. (2005, September). Catastrophic Multiple Death Fires in the United States Â– 2004,
   NFPA at
   http://www.nfpa.org/assets/files/MbrSecurePDF/Catastrophic.pdf?src=nfpa

2. Proulx, G. (2000, December). Why Building Occupants Ignore Fire Alarms. *Construction Technology Update*, No. 42 at http://irc.nrc-cnrc.gc.ca/pubs/ctus/42_e.html
3. Proulx, G. (2000, December). Strategies for Ensuring Appropriate Occupant Response to Fire Alarm Signals. *Construction Technology Update*, No. 43 at http://irc.nrc-cnrc.gc.ca/pubs/ctus/43_e.html
4. Evacuation Behavior: Why Do Some Evacuate, While Others Do Not? A Case Study of the Ephrata, Pennsylvania (USA) Evacuation. Henry W. Fischer, H.W., Stine, G.F., Stoker, B.L, et. al. (1995)
5. Disaster Prevention and Management. *Bradford*, Vol.4, Iss. 4; pg. 30 at http://proquest.umi.com.library.esc.edu/pqdweb?did=84987235&sid=1&Fmt=3&clientId=63430 &RQT=309&VName=PQD.
   Note: your school may or may not have online access to this article, please check with your instructor.
6. (Staff). (2003, March) Disasters Offer Lessons for Future. *Consulting-Specifying Engineer*, Vol. 33 Issue 3, p15 at http://proquest.umi.com.library.esc.edu/pqdweb?did=372741391&sid=1&Fmt=3&clientId=63430 &RQT=309&VName=PQD.
   Note: your school may or may not have online access to this article, please check with your instructor.

Module III: Research and Design

- Differentiate between the experimental and correlational methods.
- Identify the factors that affect the outcome of an experiment or results of correlational analysis.
- Describe various scientific methods for conducting fire-related social research and explain how each is best applied to specific avenues of inquiry.
- Describe the different types of correlational analysis.
- Compare different methods of research.
- Be current in field with respect to research findings and demonstrate the ability to locate and use current research.
- Distinguish good research from spurious research.
- Describe systems modeling and name current modeling programs.
- Give examples of two computer models that use information about building occupants to help predict overall systems (building) performance during fires.
- Describe important ways in which existing computer models differ from each other.
- Explain the logical basis for goal decomposition, and list three goal-based systems approaches that use this technique.
- Describe the two ways in which hard and soft systems approaches differ, and how these differences make the various types of models more useful or less useful.
- List two sources of assumptions used in the current method for calculating exit capacities in the model codes.

- Explain why a simple linear model of exit capacities is less valid than the effective width model and state how researchers discovered its inaccuracy.
- Identify the source of the effective width model. Describe an important limitation to the accuracy of the effective width model.
- Compare and contrast current modeling systems and explain their positive and negative features.

Module Readings:

1. Kuligowski, E. D. (2005, January). Review of 28 Egress Models. *NIST* SP 1032 at http://fire.nist.gov/bfrlpubs/fire05/art008.html
   Review of 28 Egress Models.pdf
2. Yung, D.T.; Proulx, G.; Bénichou, N. (2001). Comparison of Model Predictions and Actual Experience
   of Occupant Response and Evacuation in Two Highrise Apartment Building Fires at
   http://irc.nrc-cnrc.gc.ca/pubs/fulltext/nrcc44524/nrcc44524.pdf
   Comparison of Model Predictions.pdf
3. Pires, T.T. (2005, March). An Approach for Modeling Human Cognitive Behavior in Evacuation Models.
   Fire Safety Journal, Volume 40, Issue 2, pp. 177-189 at
   http://www.wpi.edu/Academics/Depts/Fire/News/nrcreport.pdf#search=%22Making%20the%20Nation%20Safe%20From%20Fire%3A%20A%20Path%20Forward%20In%20Fire%20Research%2C%20National%20Academies%20Press%202003%20available%20at%20NAP.edu%22
   Note: your school may or may not have online access to this article, please check with your instructor.
4. Groner, N.E. (2005, January). On Not Putting the Cart Before the Horse: Design Enables the Prediction of Decisions about Movement in Buildings at *NIST* SP 1032 at http://fire.nist.gov/bfrlpubs/fire05/PDF/f05006.pdf
   On Not Putting the Cart Before the Horse.pdf
5. *Human Behavior in Fire*, Engineering Guide, Society of Fire Protection Engineers, pp.25-41.

Module IV: Integrating Design and Behavior

- Describe how the characteristics of the physical setting in which a fire occurs influences how people respond to the emergency.
- Identify the three features of building exits that are important from a human behavioral standpoint.
- Present three examples of how human behavior can negate the effects of warning and fire suppression systems.
- Describe two methods for reducing crowding situations during emergency egress.

- Correctly rank the effectiveness of floor plans, signs, and verbal instructions in helping people find their way around buildings, and explain why these approaches fall into this order of effectiveness.
- Explain the false alarm effect and identify five steps to lessen the effect.
- Explain how task persistence can jeopardize life safety.
- Differentiate between active errors and latent errors.
- Understand the interaction and interdependence of environment and behavior.
- Identify the problems associated with protecting people with disabilities during fire emergencies.
- Describe at least two human behavioral issues associated with the use of elevators to evacuate people from large, multi-story buildings.

Module Readings:

1. Groner, N.E. (1985). Life Safety Strategies: How a Building's Designers and Users Can Work Together to Reduce the Risk of Death and Injury During a Fire. Fire Journal 79, pp. 27-30, 83-86.
   Life Safety Strategies.pdf
2. Bukowski, Richard W. (2005, February) Applying the lessons of September 11, 2001 to the built environment at http://www.fire.nist.gov/bfrlpubs/fire05/PDF/f05027.pdf.
   Applying the lessons of September 11.pdf
3. O'Connor, Daniel J. (2005, Fall). Integrating Human Behavior Factors Into Design. *Fire Protection Engineering*, at http://www.fpemag.com/archives/article.asp?issue_id=10&i=17
4. Groner, N. E. (2002, October). A Compelling Case for Emergency Elevator Systems. *Fire Engineering* Vol. 155, No. 10 , pp. 126-128 at http://search.ebscohost.com.library.esc.edu/login.aspx?direct="true"&db=aph&AN=8747705&site=ehost-live. **Note:** your school may or may not have online access to this article, please check with your instructor.

Module V: Towards Integrated Systems

- Differentiate between performance and prescriptive codes and explain the benefits and drawbacks of each.
- Discuss industry goals for the future that are informed by behavioral science.
- Apply knowledge to create a system that integrates human behavior factors into life safety planning and practice.
- Demonstrate synthesis of learning over this course by drawing conclusions based on material studied and applying knowledge to practical and realistic tasks.

Module Readings:

1. Making the Nation Safe from Fire: A Path Forward In Fire Research, *National Academies Press*, 2003, at http://www.nap.edu. Register first and then you can view a pdf online at no charge or go to

http://www.wpi.edu/Academics/Depts/Fire/News/nrcreport.pdf#search=%22Making%20
the%20Nation%20Safe%20From%20Fire%3A%20A%20Path%20Forward%20In%20Fire%20
Research%2C%20National%20Academies%20Press%202003%20available%20at%20NAP.edu%22

2. *Fire Protection Handbook*, Volume I, Section 3, Chapter 13: Performance- Based Codes and Standards for Fire Safety
3. *Fire Protection Handbook*, Volume I, Section 3, Chapter 14: Overview of Performance- Based Fire Protection Design
4. Groner, N. E. (2004). User-centered Design Can Produce Safer and More Cost-effective Buildings by Supporting the Adaptive Responses of Emergency Teams and Occupants. Proceedings of the 3rd International Symposium on Human Behaviour in Fire. London: Interscience Communications, pp. 457-462.
User Centered Design.pdf
5. *Proceedings of the 3rd International Symposium on Human Behaviour in Fire.* London: Interscience Communications, pp. 457-462. NYS Fire Acad request
6. Home Smoke Alarms and Other Fire Detection and Alarm Equipment, *Public/Private Fire Safety Council*, April 2006 at
http://www.firesafety.gov/programs/alarms.shtm
white-paper-alarms.pdf
7. Comprehensive Fire Safety Effectiveness Model - Impact of Fire, *Ontario Fire Marshals Office* at
http://www.ofm.gov.on.ca/english/FireProtection/model/fsemodel.asp
Comprehensive Fire Safety Effectiveness Model.pdf

Course Title: Managerial Issues in Hazardous Materials

Course Description:

This course presents current issues in management of a department-wide hazardous materials program. It includes issues that are pertinent to officers and managers in public safety departments, including regulations and requirements for hazardous materials preparedness, response, storage, transportation, handling and use, and the emergency response to terrorism threat/incident. Subjects covered include state, local, and federal emergency response planning, personnel and training, and operational considerations such as determining strategic goals and tactical objectives.

Course Outcomes:

1. Explain and apply local, state, and federal regulations concerning hazardous materials
2. Meaningfully participate in the process of planning, organizing, and training for response to hazardous materials/terrorist incidents
3. Understand and act on departmental responsibility for hazardous materials response preparedness, incident prevention, and incident response
4. Identify and work with representatives of multiple services, levels of government, and organizations in an organized incident management structure
5. Be conversant in issues pertaining to terrorism and tactical violence, including terrorism preparedness, response, and planning issues

Course Goals:

At the end of this course, you will be able to cite significant government regulations and voluntary consensus standards that affect hazardous materials emergency planning and response. You will be able to apply best practices and conduct a basic hazard analysis to assist in the planning, response, and termination of a hazardous materials incident. You will be able to explain the community planning process as it relates to hazardous materials at the state and local levels as well as demonstrate knowledge of the state emergency response plan and the Federal Emergency Response Team. You should be able to develop an incident command organizational structure for a hazardous materials response using the guidelines set forth in the National Incident Management System (NIMS).

Required Course Reading Materials:

1. ***Fire Protection Handbook*** **(National Fire Protection Association)**, Volumes I and II, Arthur E. Cote (Editor), 19th edition (January 1, 2003). Publisher: National Fire Protection Association; ISBN #: 0877654743.

2. ***Hazardous Materials: Managing the Incident***, by Michael Hildebrand, Gregory Noll and James Yvorra. 3rd Edition, Red Hat Publishing Company, Inc. distributed by Fire Protection Publications; ISBN 1-932235-04-3.

Course Objectives:

Module I: Introduction to Hazardous Materials

- Explain the correlation between trends in chemical use and emergency release incidents
- Explain the terms used by OSHA, EPA, and DOT to describe hazardous materials, hazardous waste, and extremely hazardous substances
- Outline the history of U.S. environmental legislation as it affects hazardous materials response
- Summarize the intent of major pieces of legislation that affect hazardous materials planning and emergency response
- Identify the major provisions of SARA Title I and Title III with regard to hazardous materials planning and response
- Identify the federal agencies that have responsibility for enacting and enforcing hazardous materials regulations and the specific area of concern of each agency
- Identify national codes and standards dealing with hazardous materials

Module II: Community Centered Managerial Issues

- Explain the terms "public alerting" and "emergency information"
- Explain the purposes of public education programs
- Explain the role that public education programs fill in community planning and right-to-know
- Compare the two primary public protection options about which the public must be educated
- Explain the requirements of an effective emergency information system
- Illustrate the role of media relations in public education and emergency information
- Explain the purpose of each of the primary steps in hazard analysis
- Compare how hazard analysis is performed at fixed facilities versus how hazard analysis is performed for transportation corridors
- Explain the purpose of performing a needs assessment regarding potential hazards
- Explain why a jurisdiction should perform a capabilities assessment regarding its existing response system
- Explain why hazard analysis is an important part of emergency response
- Illustrate the process for identifying the resources for a hazardous materials response
- Assess local resources available for hazardous materials response
- Illustrate the pre-response responsibilities of a manager planning for hazardous materials response

- Assess special resources, other than local ones, that can be used for hazardous materials response
- Outline multi-agency contingency planning and explain its importance in managing a hazardous materials incident
- Explain the purpose of the State Emergency Response Commission (SERC) and its role in managing a hazardous materials incident
- Explain the purpose of the Local Emergency Planning Committee (LEPC) and its role in the contingency planning process
- Explain the legal requirements for, and major benefits of, using the Incident Command System in contingency planning
- Explain the Community Awareness and Emergency Response (CAER) program and its possible role in the contingency planning process

Module III: Department Centered Managerial Issues

- Compare the similarities and critical differences between a "normal" fire emergency and a hazardous materials emergency
- Explain the capabilities and limitations of first responders with regard to equipment, protective clothing, training, and experience
- Explain the training and emergency response requirements mandated in 29 CFR 1910.120 (q) and compare them to NFPA 472
- Explain the certification of competency requirement and record keeping requirements
- Recognize regulated occupancies and activities related to hazardous materials
- Demonstrate methods of ascertaining code compliance for storage, handling, and use of hazardous materials
- Locate applicable codes and regulations pertaining to storage, handling, and use of hazardous materials

Module IV: Incident Response Managerial Issues

- Assess the strategic goals and tactical options for managing a hazardous materials incident
- Explain the steps of the management process at a hazardous materials incident
- Explain the types of data needed to make an accurate size-up at a hazardous materials incident
- Explain the information functions required during a hazardous materials incident
- Explain additional risk and response considerations for a hazmat incident that is also a terrorist incident
- Explain and describe the major functions of the Incident Command System and its application to a hazmat incident
- Compare the differences between a Command Post and an Emergency Operations Center
- Understand the different interest groups in the command post and their goals and concerns
- Explain the terms "recovery" and "termination"

- Discuss the necessary documentation to be produced
- Explain debriefing, post incident analysis, and after action reports
- Explain the federal precedents for cost recovery legislation
- Explain the four phases of termination

Module V: Program Management

- List four primary parts of the response system that must be evaluated
- Name the five local emergency response documents that should be integrated into the total hazardous materials response system
- Discuss the effects of change relative to the ongoing evaluation process

Course Title: Political and Legal Foundations for Fire Protection

Course Description:

This course examines the legal aspects of the fire service and the political and social impacts of legal issues. This course includes a review of the American legal system and in-depth coverage of legal and political issues involving employment and personnel matters, administrative and operational matters, planning and code enforcement, and legislative and political processes with regard to the fire service.

Course Outcomes:

1. Identify potential legal and political issues in fire and emergency services.
2. Describe legal lessons learned from recent cases, and identify best practices in the fire service to avoid legal liability.
3. Analyze and apply legal rules and political issues to manage risk.
4. Formulate political and legal conclusions and recommendations based on the analysis.
5. Locate and apply recent legal and legislative online resources.

Course Goals:

At the end of this course, you should be able to understand how to help the fire and emergency services administrator perform as an effective risk manager by recognizing legal and political issues affecting public safety, finding and applying appropriate legal rules and/or political constructs, and articulating supportable conclusions and recommendations.

Required Course Reading Materials:

1. ***Fire Service Law***, by Larry Bennett, Brady/Pearson Education, 2007, ISBN# Student: 0131552880
2. ***Fire Protection Handbook***, Volumes I and II, 19th ed. Arthur E. Cote (Editor). National Fire Protection Association (January 1, 2003); ISBN #: 0877654743.

Course Objectives:

Module I: Overview of the Law

- Differentiate between different types and branches of law
- Determine class of action as tort, contract, and property
- Identify the system of law and its functions
- Explain the importance of the due process clause of the Fourteenth Amendment to the fire service

- Define criminal and administrative warrants
- Discuss the circumstances requiring warrants and exceptions
- Define sovereign immunity and Good Samaritan protection as they relate to the fire service

Module II: Employment and Personnel Issues

- Explain U.S. constitutional law as it affects employment and personnel issues in the fire service
- Explain the impact of the First, Fourth, Fifth, and Fourteenth Amendments on personnel and employment laws
- Describe federal, state, and local laws and cases and list some specific effects on personnel and employment issues in the fire service
- Analyze issues and provide supportable conclusions by applying appropriate federal, state, or local law concerning: labor relations; Employee performance; employment discrimination; employee privacy; compensation; workers compensation; and employee benefits
- Recognize behaviors and situations that may lead to or contribute to claims of violations of constitutional protections

Module III: Operational and Managerial Issues

- Recognize legal duties of fire departments and the department members
- Identify local and state cases and laws that affect operational and managerial issues in your fire department
- Describe federal law and cases and list some specific impacts on operational and managerial issues in the fire service
- Identify behaviors and practices that may extend liability or increase the likelihood of litigation
- Evaluate policies and procedures for potential legal impact

Module IV: The Fire Official as Rule-Maker and Enforcer

- Describe the legal standards for developing policies and procedures
- Explain the legal basis for enforcement action
- Identify common model fire codes & determine applicable state and local codes in use in a specific location
- Describe legal issues that define and affect the enforcer's role

Module V: Legislative and Political Foundations

- Identify steps in making a law
- Explain how public opinion and political culture affect law enforcement
- Identify allies and adversaries in the legislative process as it affects fire service interests
- Conduct a policy analysis of a proposed or existing law
- Describe ways the fire official can effectively influence the budgeting process

Course Title: Personnel Management for the Fire and Emergency Services

Course Description:

This course examines relationships and issues in personnel administration and human resource development within the context of fire-related organizations, including personnel management, organizational development, productivity, recruitment and selection, performance management systems, discipline, and collective bargaining.

Course Outcomes:

- Identify and explain contemporary personnel management issues.
- Explain potential personnel management issues.
- Classify the collective rules, procedures, laws, policies that relate to personnel management issues.
- Analyze simple/complex personnel management issues from recruitment to retirement.
- Formulate recommendations and solutions to personnel management issues.
- Explore organizational development and leadership styles and how they relate to personnel relationships.

Course Goals:

At the end of this course, you should be able to function effectively in a comprehensive personnel management system for the fire and emergency services.

Required Course Reading Materials:

Edwards, Steven. *Fire Service Personnel Management.* Second edition. Upper Saddle River, N.J.: Pearson Education, 2005.

Course Objectives:

Module I: Introduction to Personnel Management and Organizational Development

- Analyze the societal influences and issues impacting personnel management.
- Demonstrate and evaluate how the four values serve as benchmarks for public agencies
- Analyze and evaluate how one's organization "measures up" to the five values associated with a positive work environment.
- Apply the major functions of personnel management to a program or project.
- Illustrate a systems approach to solving fire and emergency services personnel and organizational problems.

Module II: Factors Influencing Behaviors

- Compare, contrast and evaluate the major theories of motivation
- Compare, contrast and evaluate the three managerial approaches to motivation
- Research and analyze an issue that has an impact on organizational productivity and effectiveness
- Compare, contrast and evaluate the different approaches to quality management and productivity

Module III: Research and Design

- Compare, contrast and evaluate the major theories of motivation
- Compare, contrast and evaluate the three managerial approaches to motivation
- Research and analyze an issue that has an impact on organizational productivity and effectiveness
- Compare, contrast and evaluate the different approaches to quality management and productivity

Module IV: Integrating Design and Behavior

- Compare, contrast, and evaluate different approaches to performance appraisal.
- Demonstrate the appropriate evaluation procedures for performance based criteria.
- Differentiate between the concepts of corrective action and discipline and analyze the appropriate administration of discipline.
- Illustrate how corrective measures benefit fire and emergency services personnel and organizations.
- Evaluate performance management, corrective actions and disciplinary systems

Module V: Towards Integrated Systems

- Analyze agency strengths and weaknesses regarding compensation and health and safety programs and how they relate to motivation, morale, and productivity
- Research the trends and issues in contemporary society that impact the labor-management climate
  Analyze the components of a collective bargaining agreement and determine what issues are negotiable and non-negotiable
- Compare and contrast position versus interest-based bargaining techniques in arriving at a collective bargaining agreement
- Analyze the impact of mediation and binding arbitration on the collective bargaining process